

THE
SUN
OCTOBER
THE
TWENTY-FIRST
2010

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For the third issue in the 35th Volume of the Omen on October the 21st in the Year of our Lord 2010

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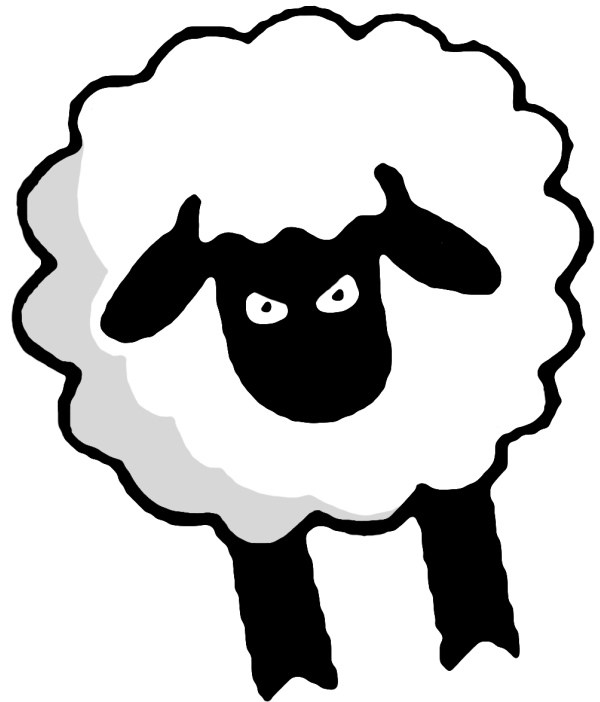
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To **Submit:**

Submissions are due always, constantly, so submit forever. You can submit in rich text or plain text format by CD, Flash Drive, singing telegram, carrier pigeon, paper airplane, Fed-Ex, Pony Express, or email. Get your submissions to omen@hampshire.edu or Ian McEwen, Box 286.

“Triumphantly!” -*Omen office computer*

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Back Cover: Sarah Jenkins
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Nathan Whitmore	<i>One of them isn't dead</i>
Ben Batchelder	<i>Didn't eat the Lindbergh baby</i>
Ian McEwen	<i>Assorted tomfoolery</i>
Stephen Morton	<i>Thirty-five redheads and a donkey</i>
Margaret McGrew	<i>One of them is dead</i>
Charles Haigh	<i>Went down on the president rather than over water</i>

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EDITORIAL

What is with Section Hate this year?

by Ian McEwen

Guys. Look at that table of contents.

Yeah. Depressing, isn't it? We have a section for C1 Long, since a whole bunch of them submitted stuff (there'll probably be one next issue too - look forward to it!). We have Section: Speak. It's not too full, but it's got some stuff. We have Section: Lies, even if it's just a placeholder plus one submission. We have a whole BUNCH of C1 Long. We're missing hate, though.

Where's the hate, guys? All three issues, even; in our first issue we just had something written by a dude at layout; the next, two things by dudes at layout plus a response to the first thing written by a dude at layout.

This is totally unacceptable. I know Ralph Hexter is gone and everyone's all positive and happy and... no, no, that's not how Hampshire works. You people are pissed about whatever you're pissed about. And you're not writing articles about it! You are HOLDING OUT ON US HERE. This is important.

Therefore: the rest of this editorial will be devoted to potential topics for you, dear reader, to write nasty, impassioned rants about. And I am not gonna be happy if Section: Hate is empty again!

Some suggested topics:

David Axel Kurtz

The shitty Omen quote in this issue
COCA and Sam Light (again!)

Community Council not doing anything

David Axel Kurtz was on Community Council!

Mod Lottery

The Omen not being online

Student Group Money Wastage

Hampshire Halloween

Racism! Always good.

That creepy guy on your hall (you know who)

Smartphones

Omen tradition: Jacob Lefton

Shitty Omen editorials

Vector Graphics

Operating Systems

The Third World

Ralph Hexter (even though he left)

The Climax

The Omen



Policy

The Omen is a biweekly publication that is the world's only example of the consistent application of a straightforward policy: we publish all signed submissions from members of the Hampshire community that are not libelous. Send us your impassioned yet poorly-thought-out rants, self-insertion fan fiction, MS Paint comics, and whiny emo poetry: we'll publish it all, and we're happy to do it. The Omen is about giving you a voice, no matter how little you deserve it. Since its founding in December of 1992 by Stephanie Cole, the Omen has hardly ever missed an issue, making it Hampshire's longest-running publication.

Your Omen submission (you're submitting right now, right?) might not be edited,

and we can't promise any spellchecking either, so any horrendous mistakes are your fault, not ours. We do promise not to insert comical spelling mistakes in submissions to make you look foolish. Your submission must include your real name: an open forum comes with a responsibility to take ownership of your views. (Note: Views expressed in the Omen do not necessarily reflect the views of the Omen editor, the Omen staff, or anyone, anywhere, living or dead.)

The Omen staff consists of whoever shows up for Omen layout, which usually takes place on alternate Friday nights in the basement of Merrill on a computer with an extremely inadequate monitor. You should come. We don't bite. You can find the Omen on other Fridays in Saga, the post office, or on the door of your mod.

The Omen Haiku

Views in the Omen (5)

Do not necessarily (7)

Reflect the staff's views (5)

SECTION **SPEAK**

Submission

by Mona Weiss (class of '05)

I graduated in 2005 with a very clear picture of what was going to happen after college. I was going to work for an animation company – what I spent my Div 3 kind of doing.

After I got my dream job making dream pay (thanks to an internship for that same company a summer earlier), I promptly started to hate it. Working for a company was absolutely nothing like I thought it was going to be. Dull, depressing, and for a creative person like me, working on someone else's vision with little time for my own personal projects was a miserable existence. I also started to wish immediately that I had taken a business class while in school because it would have made me a more valuable employee with more to bring to the table and then maybe my ideas would have been taken more seriously. I kept the job until I was fired, re-hired, then promptly fired again as I uncovered facts about the insurance fraud my company was committing. After going to exotic animal training school and trying my hand at lion/bear/leopard training, I found that the money wasn't enough to actually support myself as part of a traveling Lion Show (clearly I needed to be independently wealthy so I could pursue these silly things and afford better health insurance so my parents would be less terrified). I tried interning at another animation company to do the same thing in the hopes that I could get hired again since my work experience wasn't enough to get hired anywhere else, but the pressures of having to make money and the realization that I loved the concept of animation as an art and not the act of moving points on a graph for endless hours, was enough for me to abandon the field entirely as soon as I got hired on *Scrubs* only to find that this "regular" role I got was over as the series was being canceled.

So I wound up where most Hampshire Div-frees end

up – trying to figure out what I could do for money.

In addition to reviving my childhood acting career, I needed to do something else with myself. I was actually very lucky to start dating a very intelligent boyfriend who was smart enough to recognize that I wasn't really the type of person to work for someone else, and I should really look into starting my own business.

This concept was the strangest concept to me. I had spent my entire college career grooming myself to work for someone else, and it seemed scary and foreign to venture out on my own. I had no idea how or what to do. A few years later, that boyfriend and I were engaged. We had already started our own business and failed in a few months – mostly because we couldn't get properly capitalized. During that time I learned a lot about running my own business and I decided that it was far better to learn from that failure and start again with a new idea than to go back to working for someone else. I had tasted independence and I loved it.

Also lucky for me, I'm a smart and independent learner, and I taught myself everything I needed to know about business. I sought out many people – if I didn't know how to do something, I tried to find someone who did. I was never able to find a good mentor. My boyfriend had run a couple of businesses before so he was the best I had but with limited experience. You, Hampshire Students, don't know how lucky you are to have advisors and people on your team who can help you out. I was mired in California knowing no one and being completely out of touch with other business people who were willing to take the time to teach me what to do.

I started *Eco Nuts* over a year ago with \$1,000 I had set aside while acting. (if you want to watch me, I did a few stints on *Secret Life of the American Teenager*, *Scrubs*,

Rush Hour 3, Prom Night and a movie with Harrison Ford as well as a few indies).

The most I had to learn from was my own past failures, and I proceeded with caution, working smarter, not harder. That company is starting to thrive. I use all my art skills to design packaging for our products, and all my science skills to formulate new ones.

My passion is acting, and while I hope to do that full time someday, at least I have a company in my ownership as well. I see too many actors out here in Los Angeles who were stars on a TV show for many years and now can't seem to find another show to work on after the old one got cancelled. I'm friends with too many people who have been leads on TV series, and who were in major movies and are totally broke because they do nothing else. I find I get much more respect when I make appearances on the red carpet and I can also talk about my business.

The bottom line is, before you graduate Hampshire, take a business class. You never know when that information is going to be useful. You never know when the next amazing product will fall into your lap and there's no reason why you shouldn't be able to make money off it. I actually believe that Hampshire should have mandatory business classes. If college is supposed to prepare you for the real world, then knowing how to run a business should be top priority. Hampshire students are wildly creative and independent, so why not learn how to make money being wildly creative and independent?

Many of my fellow graduates when they got out of school had no clue what to do with themselves. Many people still live with their parents out of necessity. The economy sucks right now, and when you graduate, you'll be competing with everyone else with 10 more years of experience than you who are far more qualified, so learn how to make money on your own and monetize your talents and ideas. It just might make you a better employee, if nothing else.



The Omen Is Written By Computers Now

by Nathan Whitmore

So I'm sitting in the Omen office. People are talking about pizza and making the layout computer sing blog articles and say "buttsex". And we only have like three submissions. Which is lame. More people should submit stuff.

This week however, I was bored. And thus, I wrote a computer program to write Omen articles. It does this by scanning through Omen archive and identifying statistical patterns in them (If you're an AI nerd like me, it's actually a fourth-order Markov model with some filters to make it more comprehensible), and then generating output that matches these patterns.

In any case, I now present: all the vitriol and strangeness of the Omen, distilled into two convenient paragraphs!

Wow! In these fifteen Years, the Omen was the best way I could think of to insure my future success in life, as a rival, an enemy, a friendship doomed to fail, and maybe even as a soul mate. Hampshire College and I are on-again off-again with the threat of breaking up a constant and distinct possibility. For one, we have the search for the rest of my miserable unsuccessful virgin life. Hampshire's mission is to provide an excellent education and to be the editor of the major money decisions that are not shared with students. The only reason I came back to School, was the presence of our many First Years, simply welcome. This past May, I saw many of my miserable unsuccessful virgin life. This is an exciting year for the Dean of Students-as you know, Michelle Green signed up for two years while we got our shit together, because back then we had just hired Ralph, and the college is no longer experimenting in any significant sense. The only reason I came back to School, or in the case of our projects this year is helping to open up the cash somehow and crawling back to Hampshire for another three years. I spend as much

time as I can come up with and it is at those times that I think most seriously about having The Talk, packing up my things and leaving.

Thus, as a result, I have really only taken a literature class from about four different teachers at Hampshire College, where they teach classes solely about Roald Dahl's Matilda. (In case you were wondering, it is stated in organized detail that students will be expected to write rambling one page responses every week and sometimes complete their readings, though just showing up to class will probably suffice for an evaluation that will be completed a few months after the semester ends. If students are using substances rather than going to class because there is nothing lingering over them, as one student put it, administrators ask about what problems this may point to. By utilizing gender deconstructionist language, we will explore how to promote any variety of social causes through theatre by affecting children. Not only will we create the first sense of Hampshire Community to exist in years (hell, possibly ever) we will also turn lead to gold, resurrect Ronald Reagan, and increase my pen's size by three inches - NATURALLY! Students will be able to meet with you and talk about your problems for ten minutes, in about a week. Thus, as a result, I have to go to sleep because I have an eight o'clock class, or do I go back to my dorm room now because it's midnight and go to sleep. This underscores the difference in opinion that may result when, on I finally decided upon taking a literature class from about four different teachers at Hampshire College, solely about Roald Dahl's Matilda.



SECTION **HATE**

SECTION **LIES**

THIS IS A LIE
by Ben Batchelder

fibbledy hibbledy pibbledy poo
quibbledy jibbledy tibbledy too
quartz, schwartz, warts, torts
yibbledy nibbledy noo.

Men Trapped in a Mine in Chile

by Kiyara Leis

He had always hated being called Fat Bob. He'd come home from school, tears streaked down his chubby cheeks and his mother, hands never losing the rhythm as she pounded the bread, would coo at him. She assured him he would grow out of the nickname. Just as he would grow out of the baby fat that stuck to his bones like flies on a dog. It was the first time he remembered knowing that his mother could be wrong.

It didn't matter how many times he introduced himself as Roberto. It didn't matter that he changed jobs and towns, somehow the nickname always managed to find him. It would start with a friendly pat on the back during a round at the bar and soon the whole company was calling him it. Even the men that worked beneath him.

Nor had he managed to shake off the fat. He had tried diets. They had lasted for a day, a day and a half at most, and then he was overtaken with craving and he would be tearing apart his kitchen, stuffing everything into his mouth that would fit. His mother had bought him a membership to the gym for Christmas the year before. He had tried it once but the smell of his own sweat, caught between rolls of flesh, repulsed him. Sometimes, late at night, alone as always in his bed, he thought about cutting it off. Breath trapped beneath his momentous weight he would dream of carving his flesh in long, neat strips until he was free of it.

"Fat Bob." John had been the first of the men to cry. Great heaving sobs that had silenced them all. Sobs that scared Roberto. He wondered if they would choke

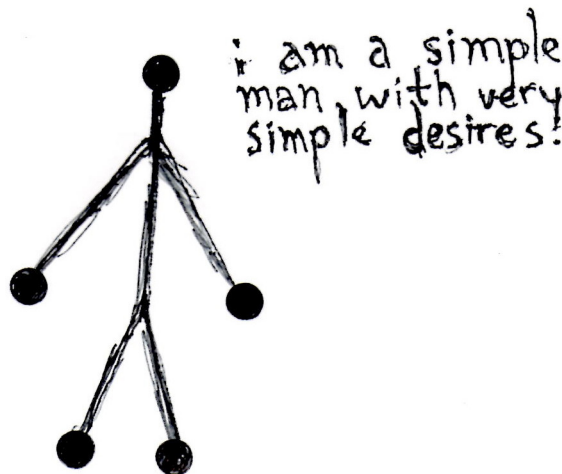
John, if they would continue forever. They hadn't. Eventually John had quieted. But it was only for a moment. His fear turned to fury and he had leapt at their earthy walls, tearing at the stone and dirt until his fingers had bled. It had taken three men to hold him down. To hold down a five foot, hundred fifty pound gringo. Bob never thought

he would see the day. He never thought he would see a lot of things. "Telephone for you." John's accented Spanish may have been different but there was nothing different about the way he gazed at the phone. He looked at it like it was Jesus stepping off the cross, like it was salvation. Roberto didn't look at it that way.

Sometimes he hated that phone. Not that he didn't want to get out. He couldn't stand the darkness, the way

the walls seemed to close in until he thought they might devour him. He couldn't stand the smell. Dirt and sweat and dead worms. He couldn't stand the men, with their constant bitching and whining and accusing eyes. But he couldn't stand the silence of the phone more. He couldn't stand the faces of his men as they talked to wives and lovers. The people that cared for them. His mother had come once. But he could barely make out what she was saying between the sobbing and the pleas to God to save him. He had asked her not to come again.

So now the only voice he heard was The Protector. The Protector changed daily; a different calm, masculine voice giving them instructions and promising them that they would be saved. They just had to hold on. Stay put. As if they were going somewhere.



“Hello?”

“Fat Bob, great news!” This Protector had the cloying cheerfulness of a weatherman announcing snow on the day of an outside wedding. “We have finally been able to begin construction on the tunnel!” Roberto felt the smile split his face, the rush of relief. Perhaps even if a few short hours it would be the clean, fresh air of the outside he would be tasting. “It should only take us about three months until we’re able to excavate you!”

Three months. They had rations for maybe two. Maybe. And even that would mean cutting their two meals down to one. And water only once a day. Light only for a hour. And the everybody’s phone time was going to be cut.

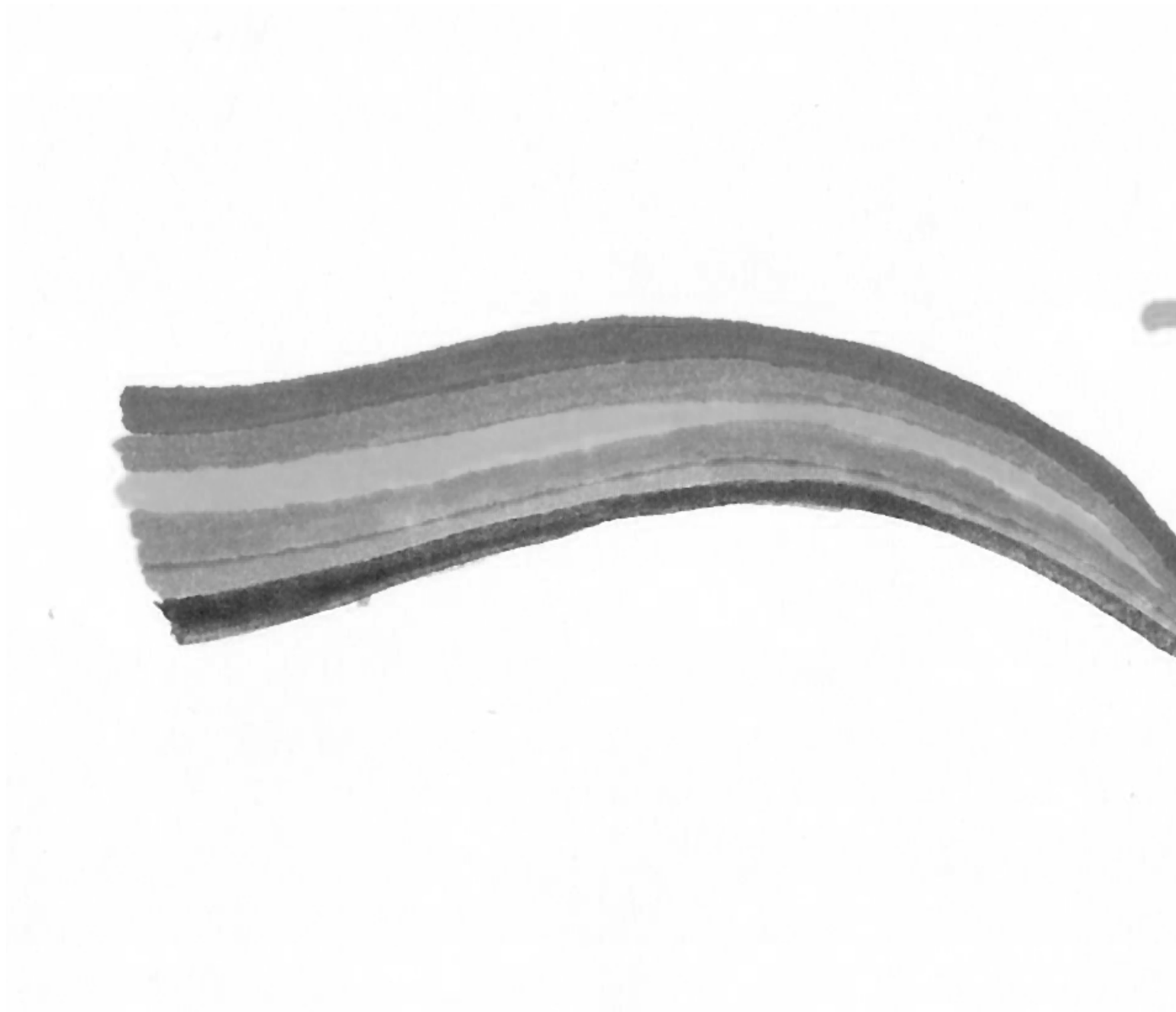
“Here’s the thing,” The Protector’s voice hesitated and then explained, “the tunnel is going to be small. Very tightly compacted to make sure it won’t collapse as you exit. You understand what I’m saying?”

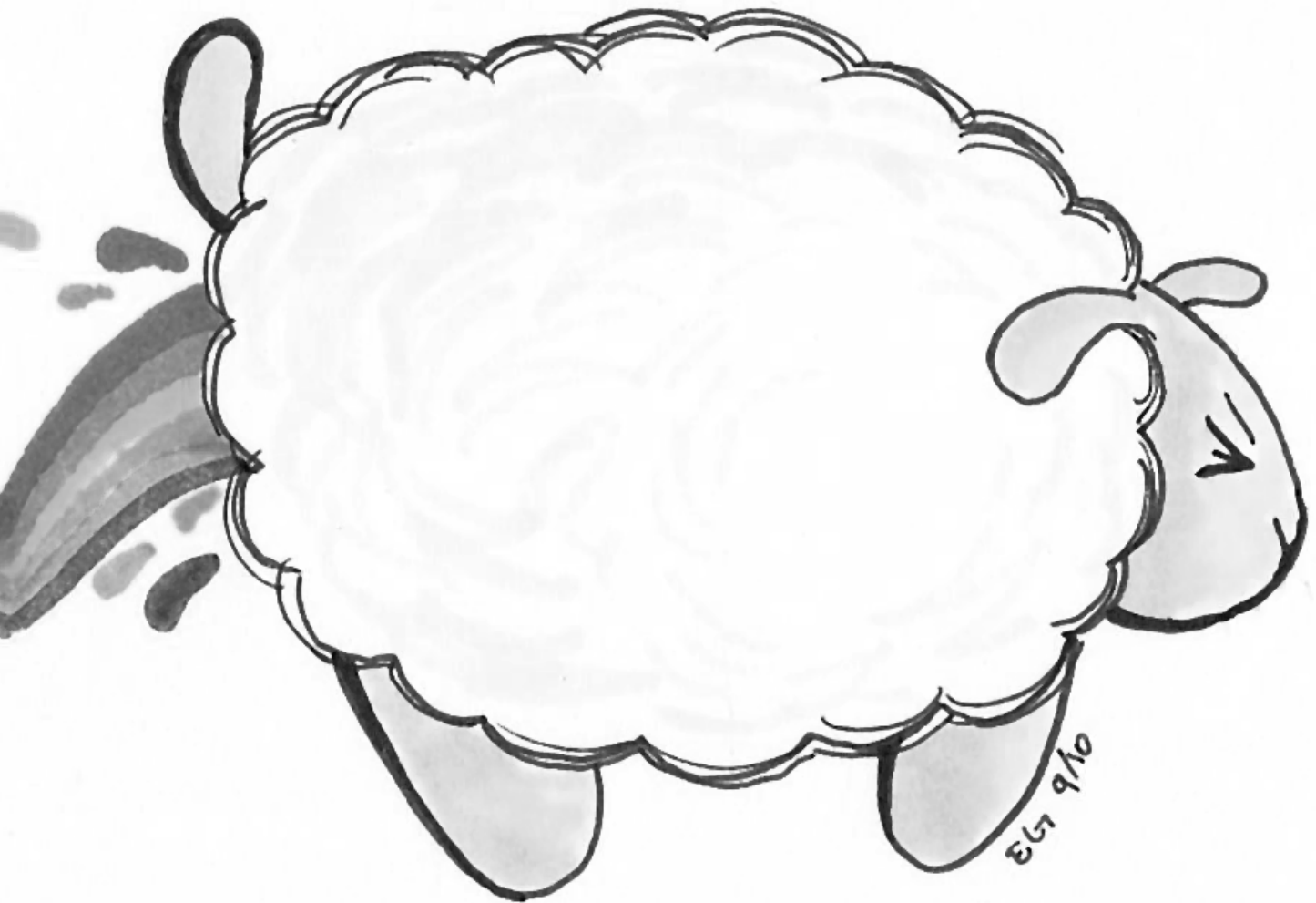
“No.” There was another precious pause. Absently Roberto wondered what words a woman could have said in that time. I love you. I miss you. I need you. Come home.

“Your, um, men are going to need to be quite small to fit through. Quite small. You understand?” Roberto flushed. He understood.

He saw the looks his men gave him. Like they were wondering where he kept his stash, whatever he was gnawing away on that kept the fat suffocating him. He knew they didn’t believe that he ate even less than them. That at first he had thought that being trapped would be almost a blessing. That he would emerge thin and fit. That some girl would see him on the television, fall in love and they would be married before the month was out. It was true that girls were going to see him. Lots of girls were going to see him. He was going to be the fat man who collapsed the tunnel.







SECTION C1 LONG

The Beetle in the Box: The Relationship between Language and the Sensation of Pain by Annie Gardiner

The relationship between language and sensation has always been a complicated one. Since no one can experience the sensations of another, we cannot know for certain whether we all perceive the world the same way, or whether we just use the same words to describe different sensations. Locke's spectrum inversion thought experiment is an interesting illustration of this problem: if I had always perceived the color red the way you had always perceived the color blue, we would both use the word "blue" to describe the same objects even though our actual perception of the object's colors would be radically different. The language of pain is similarly vague. We use terms we have created to describe our sensations of pain. It is possible that different people, however, experience pain completely differently, and because of the nature of the language we use to describe pain sensations, we would not be able to know.

Wittgenstein uses a famous thought experiment to address this problem. Imagine, he says, that everyone has a small box that only he or she can look into. Since no one can see the contents of another's box, the word "beetle" has arbitrarily come to describe whatever object is inside. No one can know if his beetle is the same as someone else's, and Wittgenstein adds that "the box might even be empty". Wittgenstein's point is that since no one can experience another's pain sensations, we cannot really understand another's sensations or know if they are the same. We can only talk about them using vague language.

Wittgenstein claims that the contents of different people's "boxes" are incomparable, since no person can ex-

perience the metaphorical "beetle" of another. I disagree, however; there is logical evidence of similar, if not identical, "beetles". Even though pain-inducing stimuli do not elicit identical reactions to all people, most behavioral reactions are similar. For example, when people report on their discomfort, they agree that a paper cut is less painful than, for example, losing a finger. This implies that even if not all beetles are identical, they are comparable. Even if we cannot be sure our beetles are similar, we say similar things when we open our boxes.

A possible objection to this may be that people have different reactions to various levels of pain. A young child might scream and cry when stung by a bee. His parent, however, would consider the sensation she experiences from the same pain stimulus to be little more than an annoyance. This could be explained by social forces—it is more socially acceptable for a young child to cry when hurt. Another possible explanation for this disparity is that over the course of our lives we learn to control our reactions to pain, causing our beetle to metaphorically shrink. This gives rise to an interesting question: Are beetles dynamic?

It seems possible that over the course of a person's life, the beetle may grow, shrink, or change over the courses of their lives. I, however, do not personally think this seems logical: first of all, my sensations of pain have not changed over the course of my life time, and second, if this were the case, people would certainly report on it. Even if I cannot compare my beetle to another person's, I can certainly compare it to itself, and could certainly re-

port on a change despite the arbitrary language surrounding the sensation of pain.

Wittgenstein also states that it is possible that “the box might even be empty.” This seems like an illogical conclusion when one considers the example of people affected by congenital insensitivity to pain with anhidrosis (CIPA). These people do not experience the sensation of pain when they experience typically pain-inducing stimuli. This condition is very rare, partially because many people affected by CIPA do not have very long life spans since they are unresponsive to pain stimuli caused by potentially life-threatening problems. For example, a person with CIPA would not feel the pain caused by an infection, meaning that it could become fatal since it could go untreated for far longer than an unaffected person would allow. It is usually apparent from a very young age that children have this condition; they often engage in self-mutilating behaviors or do not report on typically pain-inducing stimuli. It logically follows that these people do not have Wittgenstein’s “beetle”. Wittgenstein said that “the box might even be empty”, but it is clear that most people have “beetles” in their boxes, because of the noticeable symptoms of a missing “beetle”. We can thus determine whether a beetle exists in someone’s box.

We can thus conclude that it is possible to tell when someone’s beetle is radically different (or nonexistent). Smaller changes in the beetle, however, would be much more difficult to examine. The argument would rely on the assumption that people can accurately report on their sensations, which is philosophically questionable.

Most people define pain by the stimulus that causes it. For example, a person may report on a “stabbing” pain in his chest, which comes from the feeling of being stabbed. He might also report a “burning” pain in his arm. Both these reports rely on stimuli that cause the pain. It is possible that we may each perceive these different pains completely differently—for example, what feels like burning to one person may have a completely feeling to another. This opens up the possibility that pain could come in different “flavors”. Since we communicate by describing the stimulus that causes the sensation, we cannot compare our actual sensation. This is what Wittgenstein talks about when he says that our beetles might be completely different things, and we have arbitrarily cre-

ated the term “beetle” to refer to them in our language, though we cannot truly compare them.

We can, however, deduce that some important similarities between beetles exist. First of all, all people (not including those with CIPA) report the sensation of pain, regardless of its exact taste, as being an unpleasant one. This seems to me to logically suggest that different flavors of pain are still similar in some ways. People find burns unpleasant, regardless of how exactly the sensation of pain accompanying the burn feels to them.

Another interesting point is that much of the language surround pain seems to rely on perceptions. For example, many people who have never been stabbed in their lives will report, for example, a stabbing pain in their back. They are using a second-hand experience to describe their sensation. This seems like another instance of where language influences our reports of our sensations.

In conclusion, it seems that Wittgenstein’s beetle in a box metaphor is important for reinforcing that we cannot generalize our sensations as being the same as other people’s. We can know, however, that others feel these sensations, even though they may be of different flavors. So, even though I cannot look into someone else’s box, I say similar things as another person does when looking into his own. Those without anything in their boxes say nothing (such as people with CIPA). Wittgenstein’s thought experiment is very important but also needs to be more thoroughly expanded upon. 🧐

Used to be by Charles Haigh

I used to be Lebanese. This piece should come with a picture so you'll know what I look like. It's important. I don't look Lebanese. My skin is pale, my eyes are gray, and my hair is fair. So while I don't look like I'm Lebanese at the moment, it's because I'm not, not anymore. Now, I didn't look it when I was but I still was. I tell people that line all the time "I used to be Lebanese" it elicits all of our strange thoughts about what it means to be a race or a nationality or an ethnic group or whatever. I tell a little story to go with it too; until I was about ten, the man my mother was with, Monair, was Lebanese. He was my father, so so was I. Usually I say this with a laugh and a shake. I've sort of grown used to it, so it sounds a little jarring, it makes me a little exotic, and I guess I like that. But even if I laugh, and even if I mean the laugh, it's still true. I was Lebanese and now I'm not. My mother didn't just leave a man, she left a bit of me too. Some of it's about practice, some of it's about people. I didn't just have Moe, I didn't just have a father. I had aunts, I had uncles, I had cousins, a grandfather, a grandmother. I remember that Moe's sister and her husband, my aunt and uncle, lived under my grandparent's house. They payed rent and that was so strange as a child. Of course children live with their parents. Right? Always, for as long as they need. But I find myself grasping at so little. I claw the back of my skull for memories and I find so little. I remember their deck. It was always so cold. There were baskets with old toys in them. Not ancient, tin relics of past children. Just toys so cheap and so made for children that they were eternally ten years older than they should be. I remember the smell of grape leaves and of kibbeh. I remember the clean feeling of their couch and the strangeness of boxing on their television. They had a huge one, so strange for the year, that absorbed a child. Violence and the smell of steaming meat, the sound of arguing tongues and working hands. Food, food, food. We sit at the table, and happy hands scrape food from plates with pita. Eat, eat. Quickly too, everyone's got pita and is eying your plate. All of the Lebanese houses had big clay jugs all over the house, filled with water, like there wasn't a

faucet in every other room. And you had to drink without touching it to your lips. It's hard as a child, you can barely lift the jug. I could never do it. Scolding was gentle, for a child who was new to such things. I remember these things, and I forget so many others. I don't know my grandmother's name. I don't know what I called her. She isn't om-ma or nana in my head, she's a wrinkled face and a plate of food. I remember dad's undershirts. I wore them too, in the fashion of children following their fathers. I remember his gold bracelets and I remember his love of pistachio, which I hated, in the manner of children following their fathers too. He drove a big truck for a living, and I brought it in one day for show and tell. Everyone else had to carry theirs inside. Everyone had to go outside for mine. He pulled the horn cord and we were all excited and I was happy to be the one who brought it, happy to have this father. I remember sleeping in the cab, and driving to Pennsylvania thinking it must be where pencils came from, that we were going to get the latest shipment. I remember stopping at truck-stop buffets, and him eating off of my plate because kids cost less. I always told him we shouldn't, and we always did anyway. I remember being told by one of my cousins that he wasn't my real dad, but clearly he was, right? I mean, we both wore the same matching underwear and undershirts, we ate each others food, he took me to work. What else do dads do? I thought she was just being mean. I ran away and didn't ask anyone about it because I didn't need to. Not because I was afraid she was right, but because I knew there was no way she could be. I mean, if someone told me today my mother's not my mother I wouldn't ask mum about it, I'd just know they were wrong. I knew it then, I knew my cousin was wrong. But then one day, one day from no where my cousin was right. One day dad wasn't dad, he was Moe. And I didn't just lose my father, I didn't just lose undershirts and underwear and riding in trucks and hating pistachio. I lost a family, I lost a grandmother and a grandfather, and aunts and uncles, and cousins. I lost kibbeh and grape leaves and boxing and jars of water. But I used to be Lebanese.



Math 342 Topology Homework 2

by Connor Gallagher

1 Equivalence relation \sim

- a. let $(a, b) \sim (c, d) \Leftrightarrow ad = bc$ for $a, b, c, d \in \mathbb{Z}$ and $b \neq 0$ show that this is an equivalence relation.
Symmetry: $(a, b) \sim (a, b) \Leftrightarrow ab = ab$ which is true $\forall a, b, c, d \in \mathbb{Z}$

Reflexivity: If $(a, b) \sim (c, d)$ then $(c, d) \sim (a, b) \forall a, b, c, d \in \mathbb{Z}$

$$(a, b) \sim (c, d) \Leftrightarrow ad = bc \quad (1)$$

$$cb = da \Leftrightarrow (c, d) \sim (a, b) \forall a, b, c, d \in \mathbb{Z} \quad (2)$$

$$(3)$$

Transitivity: if $(a, b) \sim (c, d)$ and $(c, d) \sim (e, f)$ then $(a, b) \sim (e, f)$

$$(a, b) \sim (c, d) \Leftrightarrow ad = bc \quad (4)$$

$$(c, d) \sim (e, f) \Leftrightarrow cf = de \quad (5)$$

$$\frac{ad}{b}f = de \rightarrow af = be \quad \text{by solving 4 for } c \text{ and substituting in 5} \quad (6)$$

$$\Leftrightarrow (a, b) \sim (e, f) \forall a, b, c, d \in \mathbb{Z} \quad (7)$$

$$(8)$$

note: $b \neq 0$ thus line 6 can never have a division by 0

- b. What are the equivalence classes for this function?

$[(a, b)] = \{(x, y) \in \mathbb{Z}^2 | ax = by\}$ geometrically this equivalence class for a point (a, b) is all the points at a distance d from (a, b) along a line through (a, b) and $(0, 0)$. This equivalence class is similar to the class seen in problem 6 of last homework.

- c. let the set let $+$ be a binary operation S.T $(a, b) + (c, d) = (ad + bc, bd)$, show that \sim is a congruence relation with $+$.

To show that \sim is a congruence relation it must be shown that $[(a, b)] + [(c, d)] := [(ad + bc, bd)]$ is well defined.

let

$$(h, i) \in [(a, b)] \Rightarrow (h, i) \sim (a, b) \Leftrightarrow hb = ia \quad (9)$$

$$(j, k) \in [(c, d)] \Rightarrow (j, k) \sim (c, d) \Leftrightarrow jd = kc \quad (10)$$

If $+$ is well defined then $\forall (h, i) \in [(a, b)]$ and $\forall (j, k) \in [(c, d)]$ $(h, i) + (j, k) \sim (ad + bc, bd)$

$$(h, i) + (j, k) \sim (ad + bc, bd) \Leftrightarrow bd(hk + ij) = ik(ad + bc) \quad (11)$$

$$\Leftrightarrow bdhk + bdi j = ikad + ikbc \quad (12)$$

$$\Leftrightarrow ikad + ikbc = ikad + ikbc \quad (13)$$

by substitution in (12) for $hb = ia$ $jd = kc$ form (9) and (10).

Therefore $\forall(h, i) \in [(a, b)]$ and $\forall(j, k) \in [(c, d)]$ $(h, i) + (j, k) \in [(a, b) + (c, d)]$ therefore $[(a, b)] + [(c, d)] := [(ad + bc, bd)]$ and so \sim is a congruence.

2 Are the following spaces metric spaces?

a. (\mathbb{R}, ρ) where $\rho : \mathbb{R} \times \mathbb{R} \rightarrow \mathbb{R}$ by $\rho(x, y) = (x - y)^2$ This distance function cannot form a metric because it violates the triangle inequality. For instance let $x = -1, y = 0$ and $z = 2$ then $\rho(-1, 0) + \rho(0, 2) \not\geq \rho(-1, 2)$

b. for $x = (x_1, x_2), y = (y_1, y_2) \in \mathbb{R}^2$ let:

$$d(x, y) = \begin{cases} |x_1 - y_1| & \text{if } x_2 = y_2 \\ |x_1| + |x_2 - y_2| + |y_1| & \text{if } x_2 \neq y_2 \end{cases}$$

To show this is a metric space I will proceed in the usual way by showing that this metric satisfies the axioms of a metric space.

1. Let $x = y$, then $x_2 = y_2$ so $d(x, x) = |x_1 - x_1| = 0$. Now for $x \neq y$ there are two cases to prove that the metric is positive definite.

If $x_2 = y_2$ then $d(x, y) = |x_1 - y_1| > 0 \forall x_1, y_1 \in \mathbb{R}$.

If $x_2 \neq y_2$ then $d(x, y) = |x_1| + |x_2 - y_2| + |y_1| > 0 \forall x_1, x_2, y_1, y_2 \in \mathbb{R}$.

Thus the metric is positive definite.

2. $\forall x, y \in \mathbb{R}^2$ there are again two cases that must be considered to show $d(x, y) = d(y, x)$.

If $x_2 = y_2$ then $d(x, y) = |x_1 - y_1| = |y_1 - x_1| = d(y, x)$

because $\forall x \in \mathbb{R} |x| = |-x|$.

If $x_2 \neq y_2$ then $d(x, y) = |x_1| + |x_2 - y_2| + |y_1| = |y_1| + |y_2 - x_2| + |x_2| = d(y, x)$

because $\forall x \in \mathbb{R} |x| = |-x|$.

Thus $d(x, y) = d(y, x) \forall x, y \in \mathbb{R}^2$.

3. Now I will prove the triangle inequality for this metric, $d(x, y) + d(y, z) \geq d(x, z) \forall x, y, z \in \mathbb{R}^2$

Case 1. For an arbitrary $x, y, z \in \mathbb{R}^2$ let $x_2 = y_2 = z_2$

$$d(x, y) + d(y, z) = |x_1 - y_1| + |y_1 - z_1| \quad (14)$$

$$\geq |x_1 - y_1 + y_1 - z_1| \quad \text{by the triangle inequality} \quad (15)$$

$$d(x, y) + d(y, z) \geq d(x, z) \forall x, y, z \in \mathbb{R}^2 \text{ S.T } x_2 = y_2 = z_2 \quad (16)$$

Case 2. For an arbitrary $x, y, z \in \mathbb{R}^2$ let $x_2 = y_2 \neq z_2$

$$d(x, y) + d(y, z) = |x_1 - y_1| + |y_1| + |y_2 - z_2| + |z_1| \quad (17)$$

$$\geq |x_1 - y_1 + y_1| + |y_2 - z_2| + |z_1| \quad \text{by the triangle inequality} \quad (18)$$

$$\geq |x_1| + |x_2 - z_2| + |z_1| \quad \text{because by assumption } x_2 = y_2 \quad (19)$$

$$\geq d(x, z) \quad \text{because by assumption } x_2 \neq z_2 \quad (20)$$

$$d(x, y) + d(y, z) \geq d(x, z) \forall x, y, z \in \mathbb{R}^2 \text{ S.T } x_2 = y_2 \neq z_2 \quad (21)$$

Case 3. For an arbitrary $x, y, z \in \mathbb{R}^2$ let $x_2 \neq y_2 = z_2$

$$d(x, y) + d(y, z) = |x_1| + |x_2 - y_2| + |y_1| + |y_1 - z_1| \quad (22)$$

$$= |x_1| + |x_2 - y_2| + |y_1| + |z_1 - y_1| \quad \text{because } \forall x \in \mathbb{R} \ |x| = |-x| \quad (23)$$

$$\geq |x_1| + |x_2 - y_2| + |y_1 - y_1 + z_1| \quad \text{by the triangle inequality} \quad (24)$$

$$\geq |x_1| + |x_2 - z_2| + |z_1| \quad \text{because by assumption } y_2 = z_2 \quad (25)$$

$$\geq d(x, z) \quad \text{because by assumption } x_2 \neq z_2 \quad (26)$$

$$d(x, y) + d(y, z) \geq d(x, z) \quad \forall x, y, z \in \mathbb{R}^2 \text{ S.T } x_2 \neq y_2 = z_2 \quad (27)$$

Case 4. For an arbitrary $x, y, z \in \mathbb{R}^2$ let $x_2 \neq y_2 \neq z_2$

$$d(x, y) + d(y, z) = |x_1| + |x_2 - y_2| + |y_1| + |y_1| + |y_2 - z_2| + |z_1| \quad (28)$$

$$= |x_1| + |x_2 - y_2| + |-y_1| + |y_1| + |y_2 - z_2| + |z_1| \quad \text{because } \forall x \in \mathbb{R} \ |x| = |-x| \quad (29)$$

$$\geq |x_1| + |x_2 - y_2 + y_2 - z_2| + |-y_1 + y_1| + |z_1| \quad \text{by the triangle inequality} \quad (30)$$

$$\geq |x_1| + |x_2 - z_2| + |z_1| \quad (31)$$

$$\geq d(x, z) \quad \text{because } x_2 \neq z_2 \quad (32)$$

$$d(x, y) + d(y, z) \geq d(x, z) \quad \forall x, y, z \in \mathbb{R}^2 \text{ S.T } x_2 \neq y_2 \neq z_2 \quad (33)$$

Thus $d(x, y) + d(y, z) \geq d(x, z) \quad \forall x, y, z \in \mathbb{R}^2$. Further this shows that d is a metric. For the drawing of open balls in this metric see the back of the sheet.

3 prove the following are metric spaces and draw an open ball about the points $(0, 0)$ and $(2, 3)$

A) $d(x, y) = \max(|x_1 - y_1|, |x_2 - y_2|)$

1. $x = y \Rightarrow d(x, x) = \max(|x_1 - x_1|, |x_2 - x_2|) = \max(0, 0) = 0$

$x \neq y \Rightarrow \max(|x_1 - y_1|, |x_2 - y_2|), \forall x, y \in \mathbb{R}^2, |x_1 - y_1| > 0, |x_2 - y_2| > 0 \Rightarrow d(x, y) > 0 \forall x, y \in \mathbb{R}^2$.

2. $d(x, y) = \max(|x_1 - y_1|, |x_2 - y_2|) = \max(|-x_1 + y_1|, |-x_2 + y_2|) = \max(|x_1 - y_1|, |x_2 - y_2|) = d(y, x) \quad \forall x, y \in \mathbb{R}^2$

3. $d(x, y) + d(y, z) \geq d(x, z)$

let $i, j, k \in \{1, 2\}$

$$\text{Let } |x_i - y_i| = \max(|x_1 - y_1|, |x_2 - y_2|) \quad (34)$$

$$\text{Let } |y_j - z_j| = \max(|y_1 - z_1|, |y_2 - z_2|) \quad (35)$$

$$\text{Let } |x_k - z_k| = \max(|x_1 - z_1|, |x_2 - z_2|) \quad (36)$$

$$\text{if } i = j \Rightarrow d(x, y) + d(y, z) = |x_i - y_i| + |y_i - z_i| \quad (37)$$

$$\geq |x_i - y_i + y_i - z_i| = |x_i - z_i| \quad (38)$$

To be continued!

Honey in the Lion

by Charles Haigh

"It's going to rot off."

"You don't know that. They said there was a good chance it would take this time, but not if you give up."

"A good chance in their eyes would be none at all to anyone else."

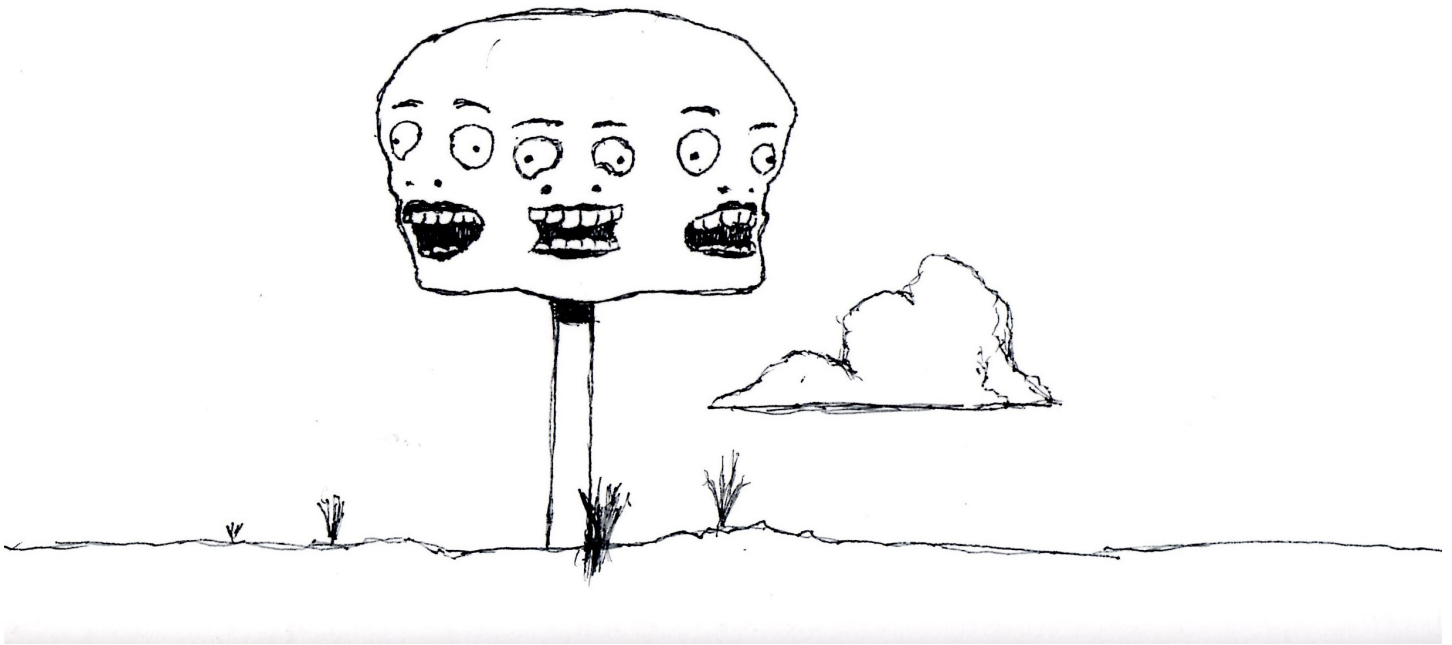
"They're the best."

"They were the best at the beginning, too."

"Yes, but that doesn't mean everything else will go wrong too."

"And it doesn't mean it won't."

He usually loved the rain. He continued to flex his left hand, looking at long, deft fingers tracing waves in the air. They were uncalledoused and smooth, well but plainly groomed nails cleanly evident at their tips. "My hands" he said quietly but stubbornly. His gaze slipped to the fingers of his limp right hand unhappily. Discolored and slightly bloated, they were no longer elegant, though the yellowed nails were still neatly groomed at their tips. He heaved shallow breaths; head slightly tilted back, water leaking from nape-length gray-flecked tawny hair to dribble on



Her fluttering fingers balled to steel fists, white-knuckled and solid, her eyes shut tight briefly at the heat in his voice.

He turned away, flexing his left hand and looking towards the right. It did not move.

"Richard, I... I," she spluttered, closing her eyes again even more briefly. She was familiar with the gesture, even if she hadn't seen it. "I have to—" He walked out of the room.

Stepping through an oversized window to a stone balcony, he felt rain fall on his left shoulder and head.

his back. He tilted ovoid glasses to wipe rain from his eyes with a linen sleeve, and turned to look through the still open window. She'd left. He ducked his head slightly returning to the room and found his eyes on an old photo on the wall directly opposite the window. It was him as a young man, hair darker and longer, his right arm curled under the jaw of a donkey, scratching. He smiled wryly, he considered his time spent as a young man mostly wasted, but he had been very fond of that donkey. The picture reminded him of his arm though, a well turned and glistening muscular forearm central to it. He turned away

and looked down to his left arm. The heavy musculature of youth had long since left him, remained a much more elegant and dexterous sheet of muscle. He found he preferred it.

Continuing to the immaculate sea-foam bathroom, he looked at his stubble-streaked jaw in the mirror. He had not left the house since Friday and had not shaved since. Tomorrow was Monday, though, and he doubted he'd have the energy to shave in the morning. He stared at the medicine cabinet neatly hung above the porcelain sink and willed it to open. They'd told him to just live normally. How could he do that if he couldn't even open a cabinet? He huffed in annoyance at his own thoughts and reached his left arm across himself to open the cabinet.

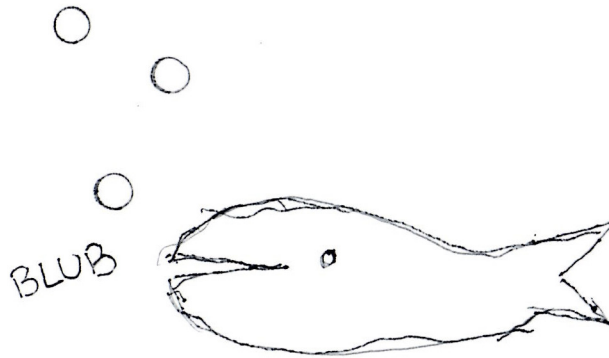
On each shelf specific things were arranged for specific purposes. He reached to the lowest and removed a wide-shallow mortar; along with a razor his father had called the "fat-boy". Shaving with one hand was very awkward, but he had grown somewhat accustomed to it, and did so with little event, though marginally slower than would be expected. Carefully wiping down the sides of the basin and cleaning his accoutrements he replaces everything to its appropriate position, nominally adjusting the ivy-toned rug as he leaves.

While without the rain there would still be some crescent of sun hanging on the horizon line he moves to his bedroom, as precisely arranged as the bathroom, the simple act of cutting hair seems to have sapped all of his strength. And like the bathroom, its vibrant riot of color manages to easily break its austere configuration. The floor is covered with a myriad of perfectly rectangular carpets, all abutting neatly but no two otherwise alike. The neat, even space between the doorway and first carpet reveals the floor to be of a very deep red hardwood, but

is otherwise unseen beneath varying depths of silk, wool, and other materials. He recalled that the green star-burst-patterned one in front of him was made of polytrimethylene-terephthalate. He remembered when she brought it home, her first. He carefully stepped over it in entering,

as he always had. His large wooden bed was arranged so that its left edge aligned precisely with the right of the door, so that four particular strides found him beside it and as efficiently under the heavy bedding which he would not have placed on it for another month or two, given the choice. He rolled over to face the interior wall, and felt an annoying shape under his side. Feeling for his annoyance with his left hand shows it to be his right arm. That's

all it is now, an annoyance. He sighs and looks to the wall, previously alabaster stucco now painted a lurid shade of blue, to "complement the rug". His last thought as he drifted to sleep was how the color might be removed.



TO BE CONTINUED...



